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# Study of cranial ultrasound to detect intracranial haemorrhage in preterm and low birth weight babies

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**Abstract**
**Introduction:** Periventricular – intraventricular hemorrhage is the most common and serious neurological complication occur in preterm which contribute significantly in morbidity as well as mortality of preterms. Our aim was to carry out neonatal cranial ultrasound screening of preterms lessthan 34 weeks of gestation to detect intraventricular haemorrhage.
**Design:** It is a prospective observational study in tertiary care centre.
**Result:** Incidence of intracranial hemorrhage found to be 17.5% after scanning 50 preterms below 34 weeks of gestation.
**Conclusion:** Most of the cases were inborn, but the incidence of intracranial hemorrhage is high in outborn (60%) We studied the incidence of intracranial hemorrhage found to be 17.5% after scanning 50 preterms below 34 weeks of gestation with cranial ultrasound and comparing risk factors be found that preterm a risk for intracranial hemorrhage found to be outborn having low birth weight and less maturity.

**Keywords:** maturity, factors, comparing, hemorrhage, factors

## Introduction

The importance of neonatal care increased over past decade has increased the survival rate of preterm infants considerably. Preterm are subjected to many complications like sepsis, RDS, ICH etc. Periventricular-intra ventricular haemorrhage [2] is the most common and serious neurological complication occur in preterm which contribute significantly in in morbidity as well as mortality of preterms. To recognize the PV-IVH early stage is necessary for better outcome. The real time ultrasonography is the method of choice to diagnose PV-IVH in preterms. Incidence found to be about 40%. The IVH is evident within the first week of life. The clinical picture is not characteristic and in about 50% of preterms there are no clinical manifestations [5]. so it is necessary to do USG scan/CT brain to detect PV-IVH in preterms. Real time ultrasonography is rapid and accurate method to diagnose PV-IVH. Use of anterior fontonelle as a natural acoustic window to image the intracranial contents in coronal. saggital and parasaggital plane [3]. Most of the IVH evident on day3 of life and maximum number of IVH detected within 1st week. So cranial ultrasound examination is to be performed to detect IVH on 3, 7, 14th day of life.
Therefore we decided to carry out neonatal cranial ultrasonography screening of preterms lessthan 34 weeks of gestation to detect IVH.

## Aims and objectives

1. To study cranial USG to identify IVH in preterms <34 weeks
2. To identify the risk factors associated with IVH.
3. To study correlation of USG findings and clinical features for immediate prognosis in above.

## Material and Methods

This prospective study was conducted in the nicu of krishna institute of medical sciences, karad.
Neonates were screened with cranial USG scan. NICU having saperate inborn and out born sections. In inborn sections, neonates born in same hospital were kept. The outborn section was for babies who were delivered elsewhere and transferred for further management.
Cranial USG were performed on day 3, 7, &14th day of life[8].

## Inclusion criteria

All preterms below 34 weeks of gestation admitted in NICU.

## Exclusion criteria

Neonates below 900 gms were excluded from this study.
Saggital and coronal scans through anterior fontonelle and through postero lateral fontonelle[6] were taken findings were noted in proforma. Cranial USG was done in all preterms <34 weeks of gestation. If it showed hemorrhage on 3rd day of life then repeat scan is done on day 7th and 14th for increase in size of hemorrhage or development of hydrocephalous. If initial cranila USG examination is normal no repeat USG was done in this preterm neonates.
All USG examinations were done by real time scanner by the transfontonelle approach with 3.5MHZ frequency sector transducer. High frequencies probe e.g 5 MHZ ,7 MHZ were used in cases of IVH.

## Observations and Results

**Table 1:** Comparison of result of IVH with place of delivery

| Inborn/outborn | No.of preterms | percentage | IVH | percentage |
|---|---|---|---|---|
| Inborn | 40 | 80 | 7 | 17.5 |
| Outborn | 10 | 20 | 6 | 60 |
| Total | 50 | 100 | 13 | 77.5 |

This table shows that the preterms who delivered in the same hospital (INBORN) had less incidence of IVH 17.5% and outborn baby had 60% incidence of IVH.

**Table 2**: Comparison of result of IVH with Birth weight

| Birth wt (gm) | no. of preterm | percentage | IVH | percentage |
|---|---|---|---|---|
| 900-1000 | 08 | 16 | 02 | 25 |
| 1001-1200 | 12 | 24 | 02 | 16 |
| 1201-1500 | 18 | 36 | 03 | 16.6 |
| 1501-2000 | 11 | 22 | 01 | 9.09 |
| 2001-2500 | 01 | 2 | 01 | 100 |
| Total | 50 | 100 | 13 | 26 |

This table shows % of IVH in preterms according to birth weight. As birth weight decreases chances of IVH increases. This table shows proforma of

**Table 3:** Comparison of result of IVH with Gestational age

| Gestational age | no. of preterms | percentage | IVH | percentage |
|---|---|---|---|---|
| 26-28 | 05 | 10 | 03 | 60 |
| 28-30 | 12 | 24 | 04 | 33.3 |
| 30-32 | 16 | 32 | 04 | 25 |
| 31-34 | 17 | 34 | 06 | 35.2 |
| Total | 50 | 100 | 17 | 34 |

The table shows comparison between incidence of IVH and gestational age.
As increase incidence of IVH with decrease in the gestational age. 60% had IVH of gestational age in between 26-28 weeks.25% preterm had IVH having gestational age between 30-32 weeks.

**Table 4:** Timing of cranial USG to detect IVH in preterms

| Preterms having IVH | USG on day 3 showing IVH | USG on day 7 showing IVH |
|---|---|---|
| 13 | 11 | 02 |
| Percentage | 84.6% | 15.3% |

Therefore out of 13 preterms who had IVH 11 preterms detected on day 3 of life and 2 preterms who had normal USG cranium on day 3 detected IVH on day 7of life i.e 84.6% of IVH in preterm develop within 3 days of life. So screening to detect IVH in preterm should be done on day 3 of life.

## Discussion

In our study 50 preterms was screened for IVH out of these 40 (80%) were delivered in our institute i.e inborn while 10 (20%) were delivered outside i.e outborn & admitted to our NICU. 7(17.5%) out of 40 inborn preterm found IVH against 6(60%)out of 10 outborn preterms. Table no 1. Higher incidence of IVH among outborn preterms than inborn. This can be explain by proper care were not taken during transport of neonate and preterm subjected to develop hypothermia ,hypoxia hypercarbia ,acidosis which are known risk factors for develop of PV-IVH.A study by Bassioung M R *et al* [7] found correlation of hypoxia degree of acidosisi hypercarbia with increased incidence of PV-IVH. In our study we correlate chances of finding IVH with the birth weight of preterms. In our study we found decrease incidence of IVH by ultrasound cranial examination with increase in birth weight of preterms. Table 2 Our finding correlate with Nzeh D.A *et al* who found incidence of ICH under subgroup A.(below 1500gms) was 28% and under subgroup b (1500-2500) was 11.8%.
Overall incidence of IVH in our study was 13% which is similar to the incidence of IVH (11.3%) noted by Chen C.H *et al* [8].
We compare the incidence of IVH with gestational age of preterm table no 3.we found that preterms in between 32-34 weeks showing higher incidence of IVH in our study because maximum number of these preterms were outborn that may get higher incidence of IVH.
In our study incidence of IVH shown to be decline with increase in gestational age of preterms. Our study findings correlated with choudhari *et al* [4] Noted 395 preterms below 35 weeks had IVH and also documented increase incidence of IVH with decline in maturity. He found 57.1% preterms had IVH below 29 weeks gestation. In our study we found 42.8% preterms in between 26-28 wks of gestation developed IVH.

## Summary and conclusion

Cranial ultrasound scan is the investigation of choice for the routine imaging of preterm neonates in neonatal care unit.
In our study we prospectively screened 50 preterms below 34 weeks of gestation admitted in NICU to detect intra cranial haemorrhage by cranial USG examination and correlate with different risk factors supposed to cause intracranial hemorrhage.
We studied the incidence of intracranial hemorrhage found to be 17.5% after scanning 50 preterms below 34 weeks of gestation with cranial ultrasound and comparing risk factors be found that preterm a risk for intracranial hemorrhage found to be outborn having low birth weight and less maturity.
Screening study is recommended since most preterm with ICH do not manifest with neurological sign and symptoms.

## Conflict of interest

There is no conflict of interest.

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